

FOR TIMEX/SINCLAIR ENTHUSIASTS

PUBLISHED BY WMJ DATA SYSTEMS

* * Volume 2, Number 3 * *

From the Desk of Bill Johnson

The Summer is normally the slow time of year for us. This year we have been very busy all year with very little slow down. This could be one excuse we could give for being a couple of weeks late with this issue. But since we feel that there is no excuse for being late we will only offer you our apologies. All we can say is we will try our best to stick to our schedule and not to be late again.

Now some good news! We have received many programs from you and you may be wondering when they will appear in QTS. Since many of these programs would take up a few pages to printout in QTS we have been holding them back to use the space for articles we have. I have decided to publish an extra issue, QTS PLUS, in September which will feature only programs for the Timex/Sinclair computers. This issue will be sent to all subscribers of QTS. If all goes well and we keep receiving a large enough number of programs this QTS PLUS will come out every six months or so. QTS PLUS will contain no articles, news or ads; only programs. A cassette of all programs contained in QTS PLUS will be available for a small fee for each type of computer, this will save typing in some of the long programs.

We have raised the subscription price of QuarTerS to \$10.00 per year or \$16.00 for a two year subscription. A 'BEST OF QTS' will also be available after the Fall 1986 issue. This will contain most of the articles which have appeared in QTS during its first two years. This is an easier way to handle the back issue demand. Details on this and the QTS PLUS cassette will be available in future issues.

We need articles on the Sinclair QL we want to cover this computer. Also we would like to see more of you take advantage of our free classified ads.

Until next time...

TELL YOUR FRIENDS ABOUT QuarTerS

THANKS FOR SUBSCRIBING!

DEAR QTS:

I am an avid Timex 2068 user and am truly grateful for your publication. It is a much needed magazine for those of us who are trying to make it alone after being locked out in the cold by Timex. I have three questions for you that I hope you can answer:

1. Is there any way to give the sound generator in the Timex 2068 a complete list of notes to play through without the computer intervening? I noticed the Commodore 64 has this quality when I broke into a program that was playing a tune, and even though the program was not running, the melody kept on going.
2. Do you know where I can get hold of the Timex Technical Guide for the T/S 2068? It contains schematic drawings of the computer and port assignments as well as information on the extended screen modes that I desperately need.
3. How about printing an article on music on the T/S 2068?

I also have another method not mentioned in your T/S 2068 Basic Tutor column to recognize special graphics characters on the screen using the SCREEN\$ command. One could relocate the character set into RAM and redefine certain unused symbols and letters so that it matches your desirable graphic characters. This way, the BASIC command SCREEN\$ can recognize your UDG's (or at least pseudo-UDG).

Yours sincerely,

Alvin Albrecht
Alberta, Canada

Dear Alvin:

Thanks for the kind words. I will try to answer your questions to the best of my ability, not having investigated the sound capabilities of the TS2068. I will answer your

second question first. The TS2068 Technical Guide is available with all known bugs corrected and professionally printed through: TIME DESIGNS MAGAZINE, 29722 Hult Rd, Colton, OR 97017. Its price is \$25.00 post paid, check or money order.

Now to your first question the TS2068 manual states that upon program termination and after every immediate command the TS2068 will turn the sound chip off. So as far as I can tell there is no way for sound to continue even though the program is not running. If I am wrong I am sure that some of our readers will let me know and I will pass the information on in a future issue.

I would love to print an article on music on the TS2068. I know that the interest in this field seems to be increasing as I have read a few article in other publications. Maybe some of our readers share this interest and can send in an article on this subject or maybe send us a song or two that will run on the TS2068.

Sincerely,

Bill Johnson

DEAR QTS:

Received my first copy of QTS last week and found it quite interesting.

I tried the program, "Address Book" and I can't make it run. In step 60, LET Z=Z+1, where is Z defined? Is something missing?

I have another question however, of more urgent importance to me. How do I interface a Memotech 64K RAM pack with my TS1500? The RAM Pak works fine with a TS1000 but not with the 1500. Is some modification needed, either to the RAM Pak or to the 1500?

I hope that you or one of your readers can help me.

Sincerely,

Blayne E. Arneson
9211 S. Harding Ave.
Evergreen Park, IL 60642

Dear Blayne:

I do not know the answer on your Memotech question so I printed your address and I am sure that one of our readers will help you out with your problem. Please share the answer with us so that we can share it with our readers.

The Address Book program was designed to run in 2K of memory so the value of Z must be put in manually. So enter LET Z=1 then enter GO TO 1 to run the program. You only have to do this the first time you use the program. After you have saved the program the value of Z will remain. Sorry if this caused you any problems as we did not notice this when we printed it out.

Sincerely,

Bill Johnson

DEAR QTS:

As long as one has a letter quality printer it doesn't matter what computer's being used or what word processor as long as the final copy looks good, but still I'm wondering if the TS2068 really has any "cottage industry" possibilities? If ye olde Timex couldn't make money and the independents have had to be extraordinarily stalwart, is the public going to be satisfied with the TS2068 for computer services? I wish you'd have an article in QTS by someone who had actually run, not a software producing, but a manuscript producing or spreadsheet and accounting service on the TS2068.

Thanks,

Joan Kealy

Dear Joan:

Good point! I believe that there are

a few businesses using T/S computers. If you recall in the SPRING 1986 issue in the DEAR QTS section Jim Scherer wrote in and described how he uses his TS1000's in his Garden Center.

About two years ago my business, WMJ DATA SYSTEMS, became to large to manage by hand. While I maintained our mailing lists on a TS2068 it was becoming a hassle with the long and sometimes unreliable cassette saving. I also wanted to handle all of the bookkeeping and wanted to computerize our rather bulky inventory. I had expanded our business to carry software for the Commodore 64 at the time, since then we also carry software for the APPLE, ATARI, IBM, and TRS-80. As you can see we no longer carried only about 75 different items for the T/S's we had increased our product line to over 500 different items. With all of this I was not able to keep track of things in my head as I used to. Things like filling daily orders, reorder points, back orders and the such were becoming difficult tasks. So I needed to computerize.

At the time disk drive units for the TS2068 were only rumors and I did not have time to wait so I decided on using the Commodore 64 we had sitting around collecting dust. If there was a disk drive unit available for the TS2068 at the time I would have opted for the TS2068. Even though this would have meant hours of programming on my part, since there were no programs out to meet my needs. So I went with the C64, which I feel is quite a bit inadequate compared with the TS2068. So with the C64 I use the ACZ GENERAL LEDGER program for our bookkeeping needs, this is a version of a program originally written for the TS1000 and then for the TS2068, and VERSAINVENTORY for our inventory needs.

While at this time the disk drives and also the QL is available it would be a very large task for me to convert all of our records over for use with one of them.

The lack of disk drive or even a built in disk drive I feel is the reason for the Timex failure as far as sales go. I feel that if a disk drive was available at the birth of the TS2068 Timex would still be marketing them and Timex would be the number one home computer in the U. S., outselling Commodore. I feel that the lack of a disk drive has also hurt the Sinclair QL take off in this country, with estimates of any where between sales of 1,000 and 20,000 QL's, depending on who you talk to. This is a very small number when it comes to sales in the U. S.

So now that I've gotten way off of the point I will get back to your comments. I believe that the lack of use of the TS2068 in other than software producing businesses is due to the lack of a disk drive at the initial marketing of the machine. I have heard from a few people who have written and mentioned that they use a T/S in a bookkeeping business and also from someone who uses it as a word processor as a freelance writer.

If any of our readers uses a T/S in their business please write in and let us know what kind of set-up you have and what chores you use it for. I think alot of readers would be interested in knowing about it.

Sincerely,

Bill Johnson.

SHORT TS1000 PROGRAM

by Chuck Dawson

```

10 REM "MATCHSTICKS"
20 RAND
30 PRINT "PICK A NUMBER 5 TO 3
0"
40 INPUT N
50 IF N>30 THEN GOTO 40
60 CLS
70 GOSUB 260
80 GOSUB 380
90 IF N=1 THEN PRINT "YOU WIN"
100 IF N=1 THEN GOTO 470
110 LET X=N-1
120 LET X=X-4
130 IF X>0 THEN GOTO 120
140 LET X=X+4
150 IF X=4 THEN LET X=1+INT (RN
D*3)
160 LET N=N-X
170 PRINT "I TAKE ";X
180 GOSUB 380
190 IF N=1 THEN PRINT "I WIN"
200 IF N=1 THEN GOTO 470
210 PRINT "YOUR MOVE "
220 INPUT G
230 IF G>3 THEN GOTO 220
240 LET N=N-G
250 GOTO 80
260 PRINT AT 4,0;
270 FOR I=1 TO N
280 PRINT " ";
290 NEXT I
300 PRINT
310 FOR J=1 TO 7
320 FOR I=1 TO N
330 PRINT " ";
340 NEXT I
350 PRINT
360 NEXT J
365 PRINT AT 20,0;"HE WHO PICKS
UP THE LAST ONE L00SES"
370 RETURN
380 FOR I=N TO N+(N*30)+(N*29)
390 FOR J=4 TO 12
400 PRINT AT J,I;
410 NEXT J
420 PRINT
430 NEXT I
440 RETURN
450 SAVE "MATCHSTICKS"
460 RUN

```


This is the fifth article in a series that discusses the various means that the basic language of the TS2068 computer provides for identification of a character in the print position of the screen. Print position is defined as the particular block of the 32 x 24 blocks of the full screen, where the very next character will be printed. Hence print positions change constantly as the screen builds up or the display changes in any way. The concept of print position is essential to devising many of the game programs written in basic. This article is concerned with POINT, and its relationship to the LINES and COLUMNS of the screen. Because there is a relationship, point can be a very useful function to determine print position.

In the four preceding issues of QuarTerS, we discussed the use of SCREEN\$, ATTRIBUTES, the System Addresses 23684/5, and the Display File starting at address 16384. The TS2068 is richly endowed and very versatile in this capacity. In following issues we will present several short game programs showing how each of these methods may be used, singly or in combination, to their best advantage.

PRINT POSITION

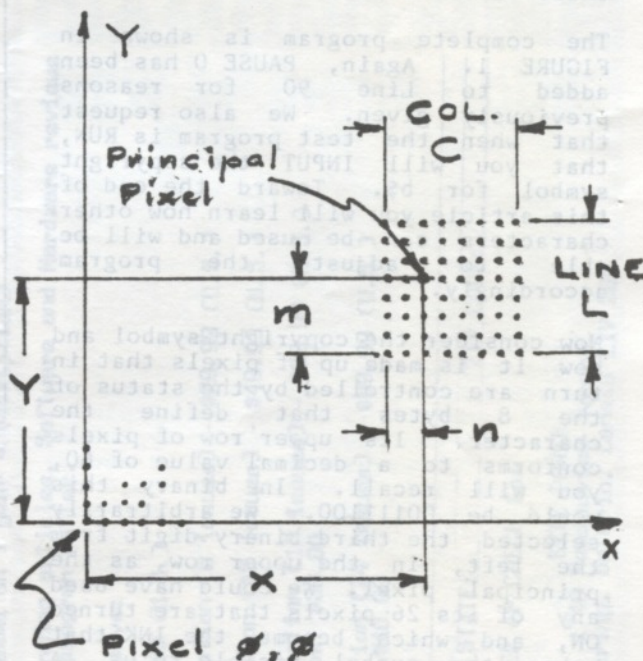
USING POINT

POINT(x,y) and PLOT(x,y) on the TS2068 are dimensioned alike, using the mathematical concept of Cartesian coordinates. Thus the computer treats the screen as though its left edge was the Y-axis and its lower edge the X-axis. This places the screen in what is known as the first quadrant. The lower, left corner is the origin where $x=0$ and $y=0$. Therefore all pixel measurements are from the origin and x , horizontal, ranges from 0 to 255, while y , vertical, ranges from 0 to 175.

We speak of Lines (or rows) and

columns and of character blocks, and usually show the screen as a grid of 32 x 24 squares, but actually it is made up of nothing but pixels and there are over 49,000 of them, some of which may be ON and some OFF. So a character block is just an 8 x 8 square-like cluster of pixels.

With this understanding in mind, we can show the mathematical relationship between Lines and Columns on one hand and pixel dimensioning of x and y on the other. Consider an enlarged view of the area around the lower left corner of the screen, showing a typical block defined by Line, L, and Column, C, and containing 64 pixels...



From this layout we can deduce that the relationship between pixel x,y dimensioning and (L,C) is...

$$x = 8 * C + n$$
$$y = 8 * (21 - L) + m$$

where "m" and "n" each have values from 0 to 7, to locate the principal pixel in the 8 x 8 cluster, measured from its own lower, left corner.

We can now go back to the usual test routine of four-direction movement and insert a Line 70 that introduces POINT as a means of detecting the principal pixel in the PRINT POSITION block. If this pixel is ON, then POINT returns a one, if OOF, it returns zero.

For "n" we used a value of 2 and for "m" a value of 7. The reason for these values will soon be evident.

The complete program is shown in FIGURE 1. Again, PAUSE 0 has been added to Line 90 for reasons previously given. We also request that when the test program is RUN, that you will INPUT the copyright symbol for b\$. Toward the end of this article you will learn how other characters can be used and will be able to adjust the program accordingly.

Now consider the copyright symbol and how it is made up of pixels that in turn are controlled by the status of the 8 bytes that define the character. Its upper row of pixels conforms to a decimal value of 60, you will recall. In binary this would be 00111100. We arbitrarily selected the third binary digit from the left, in the upper row, as the principal pixel. We could have used any of its 26 pixels that are turned ON, and which become the INK that makes the symbol visible to us. A different pixel means a change in values of "m" and "n", in Line 70.

POINT can also be used in a negative sense. It could be done by selecting a principal pixel that is OFF and then having Line 70 equate POINT to 0, instead of 1. It's not usually

done this way as an element of vagueness enters.

This article concludes the series on the detection of characters in the print position. I have tried to show how each method works, under similar circumstances, so that the various methods may be compared and the best one selected for a particular application. Most of the time it will make little or no difference. Naturally, those methods requiring extensive calculations in Line 70, like those encountered with the Byte Formula and POINT, will run a little slower than the others. But the time difference is barely perceptible as the TS 2068 calculates rapidly.

```
2 INPUT b$
4 FOR n=1 TO 35
6 PRINT AT 21*AND,31*AND;b$
8 NEXT n
10 LET L=10: LET C=15
30 LET LL=L: LET CC=C
40 LET L=L+(INKEY$="6" AND L<2
1)-(INKEY$="7" AND L>0)
50 LET C=C+(INKEY$="8" AND C<3
1)-(INKEY$="5" AND C>0)
60 PRINT AT L,C;
70 IF POINT(8+C+2,8+(21-L)+7)
=1 THEN BEEP .05,25
80 PRINT " "
90 PRINT AT LL,CC;" " AND (LL<
>L OR CC<>C): PAUSE 0
100 GO TO 30
```

FIGURE 1

PRINT POSITION

RE-EVALUATED

In working thru the examples in this series on PRINT POSITION and the various methods of identifying characters in this location, you may have discovered or have been aware that a line like Line 60, defining the PRINT POSITION, is necessary only in the case of the method that uses

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system address 23684 and 23685. In all of the other methods Line 60 could be omitted and Line 80 changed to read...

80 PRINT AT L,C;"+"

This is because these methods are dependent only upon the values of L and C, and such values are established in Lines 40 and 50. They ultimately become the PRINT POSITION because of the manner in which the program is constructed. Generally a line like Line 60 is not used at all.

The author employed Line 60 and used the same program construction throughout so that a minimum of change would occur in presenting the various methods, and to facilitate comparisons among them.

QTS

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*
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**REVIEW: ZEBRA SYSTEMS SPECTRUM
EMULATOR CARTRIDGE**

by Alvin Albrecht

DESCRIPTION: A Spectrum emulator which allows a TS2068 to run Sinclair Spectrum software.

MANUFACTURER:

ZEBRA SYSTEMS, INC.
78-06 Jamaica Ave.
Woodhaven, NY 11421

LIST PRICE: \$19.95 + \$3.00p&h
(Catalog number C226)

The ZEBRA SYSTEMS SPECTRUM EMULATOR CARTRIDGE is one of the best Spectrum emulation products around ranking high along side the ROMSWITCH. It enables the user to type in programs from the vast range of Spectrum publications and to run many excellent software packages created for it. Many exciting Spectrum peripherals can be used if plugged into a TS2068-Spectrum pin descrambler (also available from Zebra Systems).

As its name implies, this emulator easily plugs into the TS2068's cartridge slot, so you won't have to worry about attempting to install any ROM board and accidentally damaging the internal parts of your computer. When the computer is switched on, the familiar Timex and Sinclair copyright appears and you are still in the TS2068 mode. To enter the SPECTRUM mode, all you have to do is type OUT 244,3. To return to TS2068 mode, type OUT 244,0 : NEW. Because of this it is possible to leave the cartridge plugged in at all times, even when you are running TS2068 programs.

In my history of owning the emulator (which includes loading over 32 different Spectrum programs) I have never had one loading problem or seen any program that this emulator does not work on. If the program does not work, a helpful aid sheet that was included gives possible solutions to more successful loading.

Overall, I was very pleased with this product and am confident enough in it to say that it runs very close to 100% of the Spectrum software available. Ever since I bought it, a wide new world of programs has been available to me to satisfy my every taste, and with every package I have been completely satisfied. This is a buy you can't miss!

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More QL and 2068 programs available later.

REVIEW: REDCOATS

by Tom Aroella

DESCRIPTION: A strategic game written for the Spectrum which will run on the TS2068 with or without a Spectrum Emulator.

MANUFACTURER:

M. C. LOTHORIEN
56A PARKLANE
POYNTON, ENGLAND

AVAILABILITY: Directly through the manufacturer above. Imported to the U. S. by SHARP'S, RT 10 Box 459, Mechanicsville, VA 23111. Tel. (804)730-9697. Also available through many U. S. software dealers.

SUGGESTED RETAIL: \$19.95.

Redcoats is a wargame requiring strategy as opposed to quick reflexes. As the commander of either the American or British forces you must maneuver and attack the enemy while minimizing your own casualties. The game includes five pre-defined maps and battle scenarios based on actual battles from the Revolutionary War as well as the option of designing and saving your own scenarios. At your disposal are cavalry, artillery, riflemen and musketers. (Muskets are less accurate but easier to load than rifles). Each unit is listed by name with its strength, moral and whether or not it is behind cover. Based on these facts the outcome of each attack is determined. The game ends when one side or the other is eliminated. The computer then decides the winner by tallying up the casualties and assigning scores. The game can be played by two or by one against the computer at various levels of skill.

While the documentation is brief it is adequate. Included is a brief description of each battle. In loading the pre-defined scenarios the first prompt asks if the scenario is on disk, the second prompt asks if it is on tape. This order may cause some confusion in loading but poses

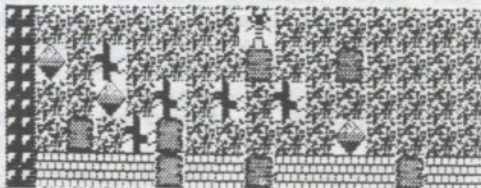
no major difficulties. The worst aspect of the game is the incessant beeping, which can only be stopped by entering a command, informing you that you must move a unit. It can be more than a little distracting as you try to plan grand strategies. The option of designing your own battles means the game has an endless number of variations.

Overall an excellent game for those wishing to exercise their minds instead of their wrists or for the frustrated Napoleon.

QTS

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TS1500 A&J MICRODRIVE PROBLEM AND SOLUTION

by Willie Jones

Let me introduce myself, and give recognition to the man that made this article possible. My name is Willie Jones and the man who solved my problem is Fred Nachbaur. You may know him from Silicon Mountain Computers, formerly known as Syncware Company. I'm the proud owner of a TS1500 A&J Micro Drive and Timex 1016 RAM pack, but not all was happy. When I first received my A&J I was in a hurry to hook it up.

I connected everything and then started to take all my most used software and proceeded to put them on Wafers. All was well until I tried to SAVE my 27K Profile. That was the start of all my problems. I should have had no problem, but boy was I fooled. To begin with the A&J ESOS (Exatron Stringy Operating System) takes the top 1K of RAM for manipulation of the ESOS. A Timex 1500 and 1016 RAM gives me 32K, minus 1K for the ESOS and you have 31K left. So a little math tells me that with 31K minus my 27K Profile, I still have 4K to burn. Boy was I surprised, when all I saw was 'VERIFY BADS' everytime I tried to SAVE my Profile.

It was no help when I changed my RAM packs than computers. I even went as far as to send my A&J interface in for a replacement, but that didn't work either. However there is a way to use the A&J, but without a Wafer directory or any other type of management, this is known as Economy Mode. It will work and uses no RAM but you have to remember what is on every wafer and you save by number not name, also you stand the chance of overwriting a program all ready saved. You also have no way of knowing how much space is left on a wafer. Like I said it will work but without the full benefits of the A&J.

Now let me tell you why it won't work and a way around the problem. The

whole thing revolves around the Timex 1016 RAM pack. It seems that it is not fully decoded, therefore, when the A&J tries to take RAM to the top it takes it beyond the 32K limit. Then when the ESOS tries to store its save check information and verification, it has nothing to compare with. This gives you a VERIFY BAD everytime you try to save a program that is more than 16K. Now for some good news, let me thank Fred Nachbaur once more for his help, without it I would not be writing this. The way around all this trouble using the 1016 RAM pack on the TS1500 is to bypass the ESOS RAM set. To do that all you have to do is poke RAM top to 31K or less. I use POKE 16388,0 POKE 16389,188 then NEW, this gives me 31K. Now instead of using USR 12345 use USR 13082 or USR 13083. This will put you in the ESOS but bypasses the RAM set built into the A&J. Now just use the ESOS menu and your ready to go. When I talked to Fred he said to POKE RAM top to 192 for the full 32K, but he also said he had not tried this. I tried this and had no luck. But by leaving 1K or more open above RAM top the system works great.

The reason for this is the ESOS needs the top 1K for its own use. By going pass the ESOS RAM set I think it affects the initialization process of the A&J, and the top 1K is not left. Well I hope this helps all you A&J TS1500 fans. I know it sure helped me.

QTS

SHORT T/S TIPS

These tips were sent in by Peter Stawasz, Clio, MI:

Here are a few more helpful hints on solving the LOAD/SAVE problems with a TS1000/1500/ZX81:

1. Try using shielded cables between one's computer and recorder. Shielded cables are usually sold in six-foot lengths and have the same 3.5mm plugs as do the coupled standard MIC/EAR cables that came with the TS computer as stock equipment. These cables are sold at a cost of around \$2.00 each, and are marketed as shielded audio cables. What this means to the TS1000 user is that these cables help to eliminate any stray electromagnetic interference that may play havoc with the delicate data transfer process of the computer.
2. Always maintain the state of your recorder--clean and demagnetize the heads at least every ten hours of use with a reputable cleaner/demagnetizer unit. This will help to maintain the quality of data transfer.

These tips were sent in by Anthony Willing, Vashon, WA:

1. Next time you have some epoxy cement mixed up, take the time to glue the key into the slot on your edge connectors (RAM packs, etc.) by placing just a bit of glue at the top and bottom edges of the key. I've had a few of these fall out and the results of misaligning a RAM pack could be disastrous when you power up. (Sinclair Canada does this on all their RAM packs).
2. If you are using Radio Shack TP-10 printer paper (cat. no. 26-1332) in your 2040 printer, put 2 pennies at each end of the roll to keep the 1/4 inch smaller roll feeding evenly. (A very cheap fix indeed).

3. If you are still using a ZX/TS in the original case, place some rubber or felt "sticky pads" under the two rear feet. This allows the RAM pack to hang freely from the edge connector, and as you press the keyboard, the RAM will not work loose and flex, which causes the familiar "white-out" and resulting loss of data.

4. In PRINT statements, strings and prompts, use key words and tokens to save memory. Instead of a line like: 20 PRINT "Enter Today's Date", use: 20 PRINT "INPUT Today's Date", which saves 4 bytes. Do this by using the keyword THEN after the first quote mark, typing the I key for INPUT, and then deleting the THEN token. The computer simply prints whatever is within the quotation marks. AND, STOP, THEN, NOT, SLOW, FAST and RUN are also good candidates to use this way. Experiment with these and have fun.

Here's a short tip from Tom Aroella, Toronto, Ontario:

By using commands ON ERROR and GOTO it is possible to set up a password routine, on the TS2068, that is if not unbeatable at least very tough. In the listing below the ON ERROR command, which treats both STOP and BREAK as errors, send the computer back to line 30 if there are any errors. The program cannot be broken into or stopped unlike if only the INPUT command was used. For added protection a FOR/NEXT loop and NEW command has been added. This allows for only three attempts at the password before erasing the program. The password can be any string.

```
10 ON ERR GO TO 30
20 FOR x=1 TO 3
30 INPUT "Password please";a$
40 IF a$="QTS" THEN GO TO 100
50 PRINT "Incorrect, try again
"
60 PAUSE 60: CLS
70 NEXT x
80 NEW
100 PRINT "You are now past the
password"
```

-----QTS

BASIC CAN BE FASTER

A dozen easy ways!

by Bill Johnson

PART TWO OF TWO

Last time we discussed four ways of speeding up BASIC. In this article we will discuss eight more ways!

5. When printing to the screen avoid scrolling the screen, this is a slow operation. Instead it is much faster to clear the screen and then print what you want.
6. Eliminate unnecessary commands and lines. On the TS2068 use multiple command lines. For example instead of...
10 PRINT "HELLO"
20 INPUT A\$

Why not write one line, as follows:

```
10 PRINT "HELLO": INPUT A$
```

This will help speed up the program. REM statements are nice and make a program easy to follow. But REM statements do slow down the program a bit. Once the program is completed why not eliminate those REM statements? If you find it necessary to keep those REM statements in the program why not bypass them. If you start a routine with the following:

```
100 REM Alphabetizing Routine
110 FOR I=1 TO N
```

It is unnecessary for the computer to read line 100. Why not use GOTO 110 or GOSUB 110 instead of GOTO 100 or GOSUB 110. This will let the computer skip right over 100 without reading it.

7. Minimize GOTO's and GOSUB's. Although these commands are used often and are fairly quick they do slow down the computer somewhat. Their arguments must be converted from decimal to binary integer. So choose and place your GOTO's and GOSUB's carefully.

8. Write your programs in a clear, structured manner. A program that

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jumps around alot slows down the computer considerably. Place the most frequently used program routines near the front of the program this will save time as the computer always starts at the beginning of the program to find a particular routine.

9. GOSUB is faster than GOTO if you will be coming back to the same part of the program later. This is because RETURN is fast. The location is stored in binary and is jumped to immediately. Also a FOR...NEXT loop can be very fast for mathematical calculations. All necessary tests are performed in machine code when using a FOR...NEXT loop.
10. IF...THEN is a very fast BASIC function. But it can also be made to work quicker. A statement IF X=1 AND Y+Z>1 THEN... will perform quicker if written IF X=1 THEN IF Y+Z>1 THEN... There may not seem to be much difference in these two statements but the second one will run a bit faster. The second statement will run very much quicker when X does not equal 1. If X is not 1 it will jump to the next program line without reading the rest of the line. While the first statement will be read in its entirety.
11. A FOR...NEXT loop can be very fast for mathematical calculations. All necessary tests are performed in machine code when using a FOR...NEXT loop. The FOR...NEXT loop saves time for the same reason the GOSUB...RETURN statement does. All necessary information is in binary, which saves the computer from converting from decimal to binary.
12. Another way to speed up a BASIC program is to insert a Machine Code routine for large programming tasks. Alphabetizing and large calculations can be done much quicker with a machine code routine. But the time spent

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in developing a machine code routine may not be worth the time saved.

I hope that these 12 ways of speeding up BASIC are of use to you. If you have any other suggestions for speeding up BASIC or anything to do with BASIC programming why not write a short article or send any suggestions for articles to me at WMJ Date System. I am always looking for ideas.

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